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Influence of cashew nut bran on performance in vivo, plasma and meat composition in goats

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Summary

In order to verify the effect of cashew nut bran supplementation on performance and characteristics of plasma and meat in goats, twelve local weaned (5-6 month) male goats with similar (mean \pm SEM) live weight (14.3 ± 1.1 kg) were used. For six months, two groups (n=6) were submitted to two diets, without (WC) or with 13 % cashew nut bran supplementation (SC). The rations were offered at 2.5% of BW and corrected every seven days. Immediate before slaughter, blood samples were collected by venipuncture in order to determine cholesterol, lipids and protein concentrations in the plasma. After slaughter *Longissimus dorsi* muscle was removed for cholesterol, total lipid and protein levels analyses. During the experimental period the mean daily weight gain(mean \pm SEM) recorded was similar for WC and SC groups (66.1 ± 14.9 g vs. 53.9 ± 11.4 g, $P > 0.05$). Results showed a significant increase ($P < 0.05$) for total lipids concentrations in plasma and meat in SC. However the cholesterol and proteins levels were statistically similar between groups ($P > 0.05$). In conclusion supplementation with cashew nut bran did not affect the in vivo performance of goats. In addition cashew nut bran increased the lipid amounts in plasma and meat but did not modify the protein and cholesterol levels.

Keywords: goat, meat, cashew nut bran, weight, plasma

Introduction

In North-eastern Brazil, the periodic droughts, impose severe restrictions to the food offer and is a main drawback of goat husbandry (Pfister & Malechek, 1986). In this area cashew is an important source of agricultural by-products. Harvest of cashew is concentrated during the dry season and for this reason its by-products as cashew nut bran represents an abundant and cheap resource of energy for goat meat production during the critical periods of food shortage (Holanda et al, 1996). Although cashew nut bran is usually used for the farmers in northeast of Brazil very few studies were carried out in goats feeding to investigate its influence on animal response. Thus aim of this work was to evaluate the in vivo performance in goat supplemented with cashew nut bran as well to verify the effect of this by-product on plasma and meat composition.

Material and methods

1 The experiment was conducted at Federal University of Ceará – Brazil (3°43' S and 38°30'
2 W). Twelve local weaned (5-6 month) male goats with a mean (\pm SEM) live weight of $14.3 \pm$
3 1.1 kg were used. Two groups ($n = 6$) were determined according to diets, without (WC) or
4 with cashew nut bran supplementation (SC). All animals received a basal diet of elephant
5 grass plus concentrate containing corn, soybean meal and mineral premix. In concentrate of
6 SC group was added also 13% of cashew nut bran (fresh material basis). The percent
7 composition for WC and SC diets was: dry matter 88.3 and 89.1%; total digestive nutrients
8 76.4 and 78.9%; fat 2.3 and 6.8%; crude protein 20.2 and 20.0%. The rations were offered at
9 2.5% of BW and corrected every seven days. The experiment lasted for six months.

10 The goats were kept in individual shaded pens with free water and salt access and
11 submitted to twenty days of housing and feeding adaptation. Every week, all animals were
12 weighed. Immediate before slaughter, blood samples were collected by venipuncture for
13 determination of cholesterol, lipid and protein concentrations from plasma (AOAC, 2000). At
14 slaughter *Longissimus dorsi* muscle was removed from the carcass and submitted to analysis
15 of cholesterol (Maia & Amaya Rodrigues, 1993), total lipid and protein levels (AOAC, 2000).

16 All data were analyzed using SAS (SAS, 2002). The effect of cashew nut
17 supplementation (WC or SC), was analyzed by GLM procedure. Comparison between means
18 of nutritional treatments was performed by the Student t test. Values were represented as
19 mean \pm SEM.

20 21 **Results and Discussion**

22
23 At the end of the experimental period the mean live weight recorded was similar for WC than
24 for SC group (24.88 ± 2.65 kg vs. 18.88 ± 2.97 kg; $P > 0.05$). Figure 1 show the daily weight
25 gain recorded during the experiment. The diet did not affect the daily weight gain of goats (P
26 > 0.05). The mean daily weight gains (DWG) were respectively 66.1 ± 14.9 g for WC goats
27 and 53.9 ± 11.4 g for SC group. This result is in agreement with Rodrigues et al., (2003) that
28 reported in crossbred sheep supplemented with four levels of cashew nut bran (0, 12, 24, 36
29 %), similar weight gain and feed conversion within the four groups. However the same
30 authors reported a linear decrease of dry matter, protein and fat intakes when increasing the
31 total lipids concentration of diet. The advantage of the use of fat is usually associated to the
32 increment of the energy diet density in ruminants, but elevated levels can induce a decrease of
33 dietary digestibility. Palmquist (1989) suggests for lactating cows a supplementation of 5 -
34 6% of fat in the diet. Although DWG of the present study can be considered below the
35 performance exhibited for specialized meat breed goats (Goetsch et al, 2004), our results are
36 in agreement with responses reported in the same region with Anglonubian goat (Rondina et
37 al, 2003).

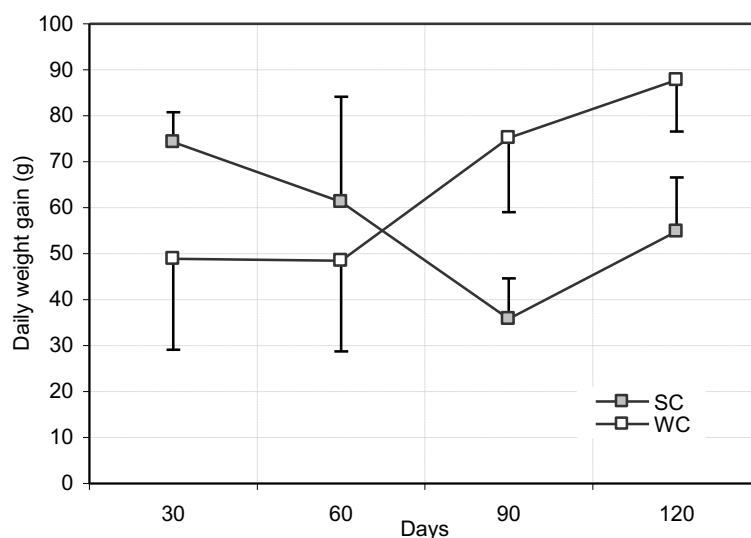


Figure 1. Daily weight gain in male goat supplemented (SC) or not supplemented (WC) with cashew nut bran. ^{a,b} $P < 0.05$. Values are mean \pm SEM

Concerning the meat and plasma characteristics, it is important to point out that in all animals the mean values of lipids, cholesterol and protein levels of *Longissimus dorsi* (Table 1) were within the limits reported for other authors (Madruga et al, 2001) in breeds or genetic types of North-eastern Brazil. In supplemented cashew nut bran group concentrations of lipids showed an expected significant increase ($P < 0.05$) in both plasma and meat. By contrast no difference was observed between groups for cholesterol and proteins levels ($P > 0.05$), in disagreement with Freitas et al, (2000), that reported a reduction of cholesterol in broilers fed with cashew nut bran.

Table 1. Total lipids, protein and cholesterol levels in plasma and meat of male goat supplemented (SC) or not supplemented (WC) with cashew nut bran.

Parameters	SC		WC	
	Plasma	Meat	Plasma	Meat
Lipids	241.8 \pm 12.8 ^a	4.9 \pm 0.4 ^a	207.3 \pm 9.5 ^b	1.9 \pm 0.2 ^b
Cholesterol	65.4 \pm 2.3	59.7 \pm 1.9	72.8 \pm 5.6	54.4 \pm 2.0
Proteins	16.9 \pm 0.7	19.5 \pm 0.2	17.4 \pm 0.9	21.3 \pm 1.3

^{a,b} $P < 0.05$

In conclusion, first results tended to indicate that supplementation with cashew nut bran did not affect the in vivo performance in goats. Also our findings showed that cashew nut bran increase the lipids amounts in plasma and meat but not modify the protein and cholesterol levels. Together these results suggest that cashew nut bran is likely to use during drought season as source of diet supplementation in goats.

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